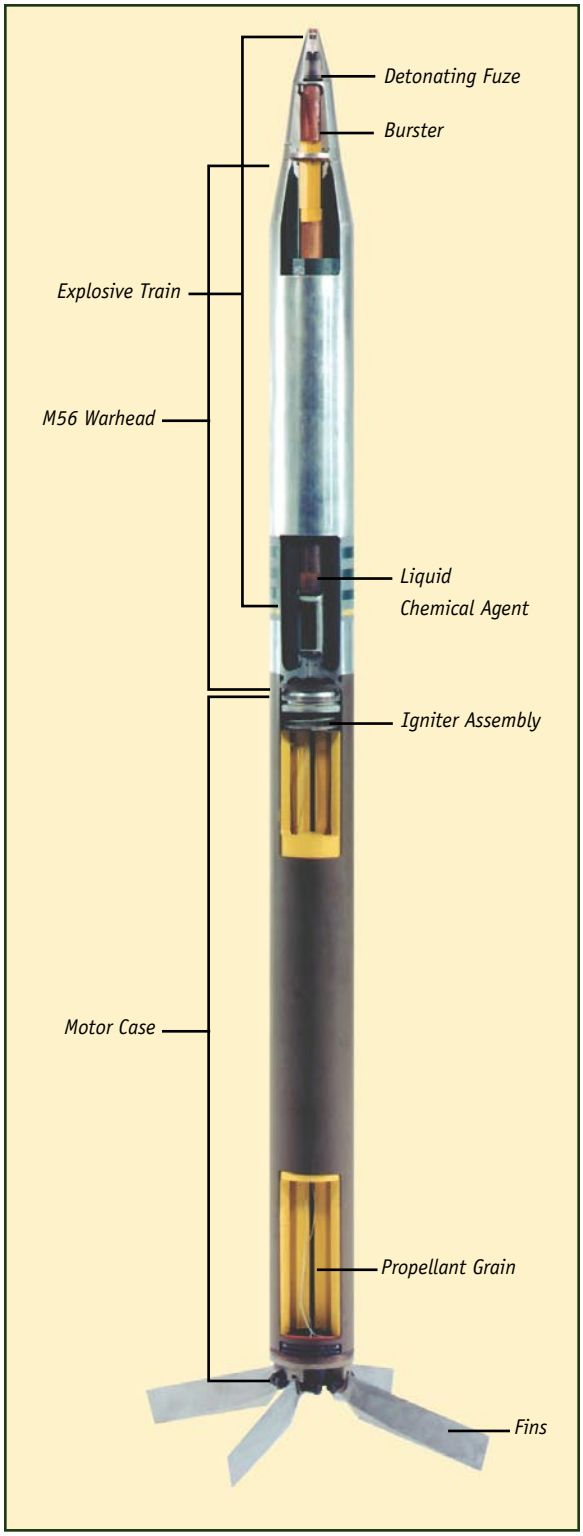
M55 Rockets

What are M55 Rockets and Where Are They Located?

An M55 rocket consists of a fin nozzle assembly, a rocket motor, a chemical agent-filled warhead and fuze. The aluminum warhead contains either 10.7 pounds of liquid GB or 10.3 pounds of liquid VX nerve agent, a burster and a detonating fuze. An M55 rocket is 78 inches in length and approximately 4.5 inches in diameter. Each individual rocket is stored in a fiberglass shipping and firing tube.

When the rocket is fired, the propellant in the rocket motor ignites and propels the rocket—guided by its spring-loaded aluminum fins—to its target. Upon impact, the fuze detonates and bursts the warhead, aerosolizing and releasing the liquid nerve agent. M55 rockets are the only munitions in the United States chemical weapons stockpile to have an explosive train, a motor and a warhead which work to ignite, propel the munition and release agent, respectively. It is the only munition in the stockpile with this self-propelling ability and is therefore the most dangerous of all chemical weapons.

Originally, M55 rockets were stored at six locations in the United States and Johnston Atoll in the Pacific. Due to CMA's disposal efforts, as of February 2008, GB and VX-filled M55 rockets are stored at only one location in the United States: Blue Grass, Kentucky. The Assembled Chemical Weapons Alternatives (ACWA) is responsible for destroying the United States' remaining M55 rockets at Blue Grass Army Depot (BGAD), but CMA is responsible for the storage of these munitions. M55 rockets are stored in earth-covered, steel-reinforced concrete structures commonly referred to as "igloos." Each igloo holds between 2,000 and 3,000 rockets and only stores one type of nerve agent munition.



For more information, contact the CMA Public Affairs Office at
(410) 436-3629
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M55 Rockets (continued)

Prior to disposal, rockets are safely stored in earth-covered steel-reinforced concrete structures commonly called "igloos" that protect and secure the munitions. These sealed igloos also protect the surrounding community and the environment.

M55 Rockets in the Chemical Weapons Stockpile

During World War I the United States began testing and experimenting with blister (mustard) chemical agents. As chemical weapons technology evolved, more complicated chemical agents were created and mass-produced, including nerve agents GB and VX. Beginning in the late 1950s, the U.S. Army developed rockets that provided short-range tactical support for the warfighter. Hence the M55 rocket was born.

Between 1961 and 1965, the U.S. Army produced more than 400,000 M55 rockets. The rockets were filled with GB at Rocky Mountain Arsenal in Colorado, and filled with VX at Newport Army Ammunition Plant in Indiana. M55 rockets were never used in combat, but served as a deterrent against opponents using chemical weapons against the U.S. or its allies. The M55 rockets were declared obsolete in 1981. In 1985, Congress mandated that all chemical weapons be safely destroyed.

Challenges in Storing M55 Rockets

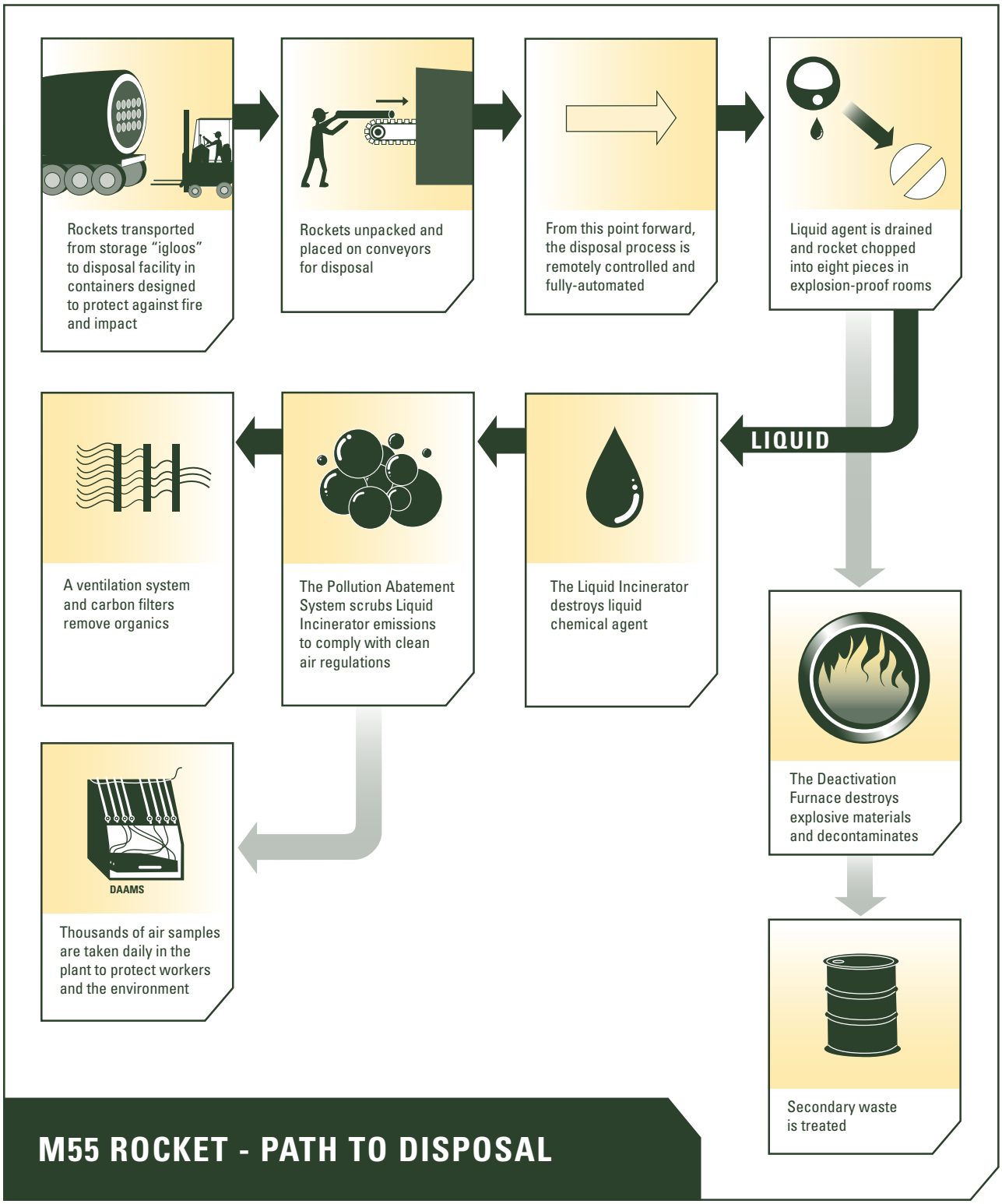
While M55 rockets are the youngest munition type chronologically in the chemical weapons stockpile, they are also the most problematic. M55 rockets were constructed with a thin aluminum body as opposed to other chemical weapons that are constructed of much heavier gauge aluminum plate or steel, increasing the risk of storing the rockets. Over the course of time, GB nerve agent becomes acidic and eats through the aluminum warhead making the rocket prone to leaks. The majority of leaking rockets have small vapor leaks; very few rockets are found to be leaking liquid agent.

The U.S. Army has several safety measures in place to contain leaking rockets. First, the storage igloos in which the rockets are kept are routinely monitored with highly sensitive air monitoring equipment to ensure that no agent is being released. In the event of an agent release in the igloo, properly equipped workers seal the leaking rockets in protective steel tubes known as "overpacks" which prevent further leakage. Leaking munitions are then taken out of their original storage igloos and stored separately. Under environmental controls, leaking rockets do not pose a hazard to the surrounding community.

Leaking rockets are not the only risk discovered in storing rockets. Stabilizing agent was added to the propellant in the rockets during production to help preserve the integrity of the propellant.

In 1995, the Army created the Enhanced Stockpile Surveillance Program to improve its monitoring and inspection of M55 rockets. Studies completed by this program and other overseeing agencies find that there is less than a one-in-a-million chance of a non-leaking rocket auto igniting before the year 2013. More recent

M55 Rockets (continued)



Using incineration technology, the aluminum warhead is punched through its shipping and firing tube and drained of all liquid agent fill. Liquid nerve agent is sent to an incinerator for disposal while the remaining rocket casing is chopped into eight pieces and destroyed in the Deactivation Furnace System.

M55 Rockets (continued)

laboratory tests, data and input from experts suggest that the chance of auto ignition is even less likely than estimated in the study. Yet these same studies have demonstrated that while the storage of the M55 rocket presents no immediate threat of auto ignition, the rockets still present a risk of ignition from external events such as lightning and earthquakes. Consequently, each of the sites that stored or currently store M55 rockets have completed risk assessments and corresponding contingency plans to provide the safest storage possible.

M55 rockets were the first munition type to be destroyed at each of the CMA disposal sites because of the M55 rocket's ability to propel itself into the surrounding area, its aluminum construction and the liquid nerve agent GB's tendency to leak through the rocket's warhead. CMA's disposal of the rockets was completed at state-of-the-art disposal facilities.

Disposing of M55 Rockets

M55 rockets not only pose a problem in storage, but created additional difficulties during disposal. When the rockets were developed and produced, disassembly and disarmament were not a consideration. Construction of the M55 rocket includes a burster well fuzed within the chemical agent warhead, making it impossible and extremely dangerous to try to separate the two. The warhead is also attached to the motor case, making it a fully-armed munition. Plus, all M55 rockets are stored in their shipping and firing tubes, adding another complication to rocket disposal.

U.S. Army experts devised a proven and safe method for destroying M55 rockets without separating the sections of the rocket. Using an automated process, under strict engineering controls, the rockets were punched through the firing tube and warhead wall and the chemical agent was drained and sent to the Liquid Incinerator for final disposal. The drained rocket, still in its shipping and firing tube, was then sheared into eight pieces and destroyed in the Deactivation Furnace System. The resulting fiberglass ash and melted aluminum was monitored to ensure no agent contamination.

Creating a Safer Tomorrow

During the 20th century, the U.S. Army created chemical weapons to protect citizens of the United States against other countries that had chemical weapons. Since then, the threat of this type of warfare has dwindled and the stockpiled munitions declared obsolete. The United States is destroying these weapons safely to protect its citizens, the environment and people around the world.

The Army expedited M55 rockets disposal because of associated storage risks. Since the rockets under CMA's disposal mission were destroyed in February 2008, the overall risk of chemical weapons storage in the United States has been reduced by 94 percent. When the remaining M55 rockets at BGAD have been destroyed, the risk associated with these weapons will be eliminated. Until then, the U.S. Army Chemical Materials Agency is committed to keeping the stockpile and its facilities safe for workers, the community and the environment.

Additional Information

To view the composition of an M55 rocket and its propellant see CMA diagrams "Anatomy of An M55 Rocket" and "M28 Propellant Grain."

To find out more about the various chemical agents and chemical weapons in the United States' chemical weapons stockpile, see CMA Fact Sheet "What Are Chemical Agents and Chemical Weapons?"

For more information about M55 rockets or about the Chemical Stockpile Disposal Program, please contact the U.S. Army Chemical Materials Agency Public Affairs Office at (410) 436-3629 or (800) 488-0648, or visit the Web site *www.cma.army.mil*.

For more information about ACWA and the destruction of the remaining M55 rockets at BGAD, please visit *www.pmacwa.army.mil*.

U.S. ARMY CHEMICAL MATERIALS AGENCY

The U.S. Army Chemical Materials Agency is responsible for safely storing and eliminating the United States' aging chemical weapons and agent stockpiles and for the safe elimination of recovered chemical materiel.